Survey of a recently discovered subpopulation of the Critically Endangered Taita Apalis *Apalis fuscigularis* in the Taita Hills, Kenya

Luca Borghesio[a], Lawrence Wagura[b] and Mwangi Githiru[b]

Inventaire d'une sous-population de l'Apalis des Teitas *Apalis fuscigularis* récemment découverte dans les Taita Hills, Kenya. En octobre 2011, les auteurs ont découvert une sous-population préalablement inconnue de l'Apalis des Teitas *Apalis fuscigularis* – espèce classée comme « Gravement menacée d'extinction » – à Msidunyi, Taita Hills, Kenya du sud (03°24'15"S 38°18'00"E). Son statut a été évalué en six périodes de travail sur le terrain (octobre 2011–mars 2014). Le site comptait sept territoires, situés dans un cordon de fourrés indigènes (45–50 ha) entourant un lambeau de forêt indigène (7,1 ha). Ainsi, Msidunyi pourrait contenir jusqu'à 15% de la population mondiale de *A. fuscigularis*. Les données collectées indiquent que l'espèce est nicheuse et que les territoires se trouvent principalement dans la bande de fourrés indigènes, plutôt que dans la forêt. Les plantations d'arbres exotiques sont fortement évitées, ce qui semble indiquer que la population locale de l'Apalis des Teitas augmenterait si ces plantations étaient supprimées. La capture d'individus a révélé que le sexe et l'âge peuvent être déterminés en se basant sur la couleur de l'iris et les caractéristiques du plumage. L'impact humain sur le site s'accroît, notamment par l'abattage sélectif des arbres indigènes et l'expansion de l'agriculture. Il apparaît donc que Msidunyi est un site clé, mais très menacé, pour l'Apalis des Teitas. Les interventions de gestion devraient se concentrer sur la suppression des plantations d'arbres exotiques afin d'accroître l'étendue de l'habitat favorable à l'espèce.

Summary. In October 2011, we discovered a new subpopulation of the Critically Endangered Taita Apalis *Apalis fuscigularis*, in Msidunyi, Taita Hills, Kenya (03°24'15"S 38°18'00"E). We assessed its status during six field work periods (October 2011–March 2014). The site supported seven territories in a belt of indigenous thicket (45–50 ha) surrounding a patch of indigenous forest (7.1 ha). Msidunyi might therefore hold up to 15% of the global population of *A. fuscigularis*. Our data suggest that breeding occurs in the area and that territories are mainly located in the indigenous thicket belt, rather than in the forest. Plantations of exotic trees are strongly avoided, suggesting that removal of these plantations would probably result in an increase in the Taita Apalis population at the site. Based on mist-netting data, sex and age can be identified using iris colour and plumage features. We provide evidence of increasing human impact, namely selective logging of indigenous trees and agricultural expansion. Our results suggest that the site is a key, but highly threatened, stronghold for Taita Apalis. Management interventions should focus on removing exotic tree plantations to expand the area of suitable habitat for the species.

Taita Apalis *Apalis fuscigularis* is a Critically Endangered species endemic to the Taita Hills in southern Kenya. Its global population was estimated at 310–654 individuals in 2001 (Borghesio *et al.* 2010). However, monitoring data suggest a strongly negative population trend in recent years (Borghesio *et al.* 2014), and the species may now number just 100–150 individuals (BirdLife International 2014a). The causes of the decline are not completely clear, but nest predation as well as human disturbance and habitat clearance at forest edges might all be implicated (BirdLife International 2014a). Action is urgently required to reverse this negative trend. In particular, the identification and protection of all remaining subpopulations is a priority.

In October 2011, we discovered a new subpopulation of *A. fuscigularis* in the Taita Hills, at a site known as Msidunyi (Borghesio & Wagura 2012). The small indigenous forest patch and the surrounding belt of indigenous thicket are highly threatened, as they are not protected and are surrounded by expanding agriculture. Preliminary observations suggested that Msidunyi might be a key site for Taita Apalis.

In this paper, we summarise the results of field work undertaken at Msidunyi between October 2011 and March 2014. The work aimed to estimate the size, distribution, habitat use, breeding and sex ratio of the local subpopulation of *A. fuscigularis*. Our results confirm the importance of the site as a stronghold for the

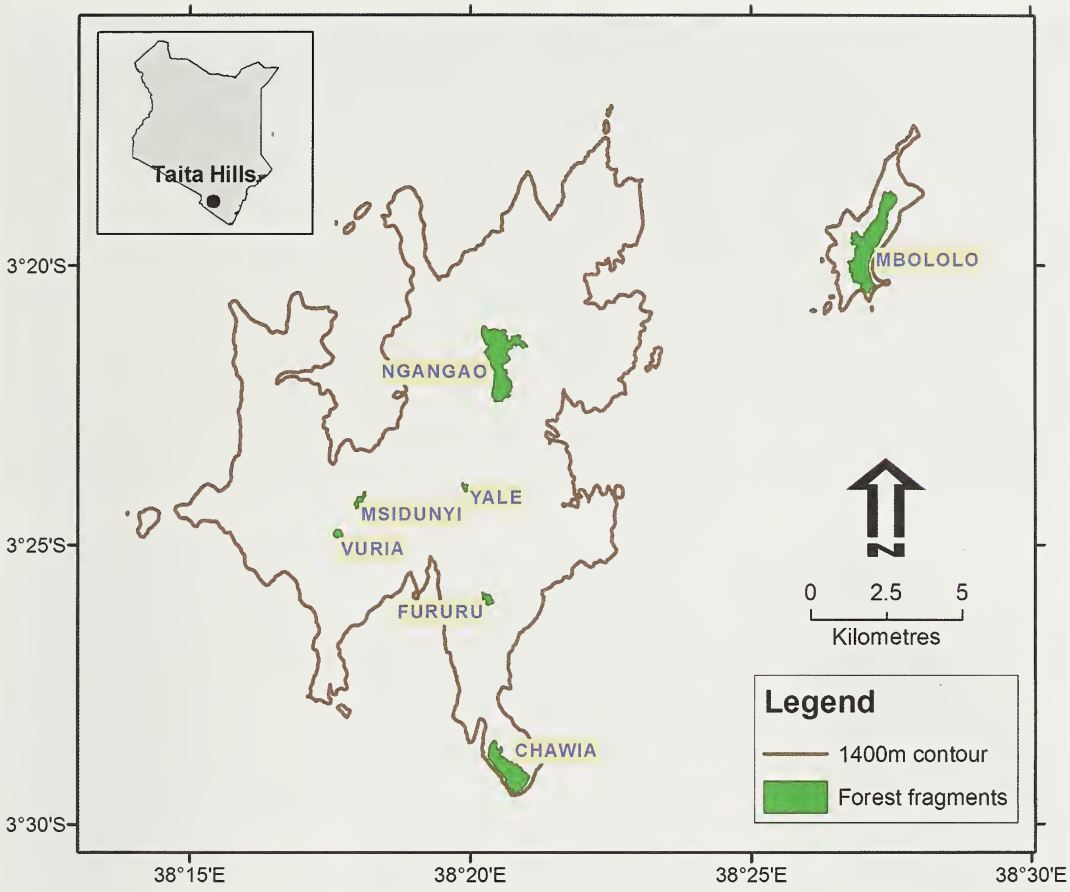

Figure 1. Map of the Taita Hills, showing the forest fragments where Taita Apalis *A. fuscigularis* is currently known to occur. The 1,400 m contour marks the transition between lowland and montane vegetation in the region.

Carte des Taita Hills, montrant les lambeaux de forêt où la présence de l'Apalis des Teitas *A. fuscigularis* a été attestée. La courbe de niveau de 1.400 m marque la transition entre la végétation de plaine et montagnarde.

species, as well as for other endemic and globally threatened taxa. We also document increasing human pressure and steady degradation at the site. This information will be important to inform management at Msidunyi and at other sites where the species occurs or might be reintroduced in the future.

Study area

The Taita Hills are a small massif in southern Kenya, with an area of *c.*150 km² above the 1,400 m contour, which marks the transition between lowland and montane vegetation. The original vegetation was Afromontane forest, but deforestation has been rampant during recent decades: up to 98% of the original vegetation cover might have been lost (Newmark 1998), with *c.*50% of that loss within the last 50 years (Pellikka *et al.* 2009). Currently, there is <500 ha of indigenous forest remaining, scattered over 11 fragments, six of which are smaller than 4 ha (BirdLife International 2014b). The Taita Hills are situated at the northernmost end of the Eastern Arc, one of the 34 most important biodiversity hotspots in the world, and boast several endemic biota, many of which are globally threatened. Two bird species are endemic to the area: Taita Apalis and Taita Thrush *Turdus helleri*, both of which are considered Critically Endangered (BirdLife International 2014a,b).

In October 2011, we visited a fragment of natural forest at a site called Msidunyi (Fig. 1), where we discovered the presence of Taita Apalis for the first time (Borghesio & Wagura

Figure 2. Views of Msidunyi. **(a)** the interior of the closed-canopy forest patch between T04 and T06, October 2011; **(b)** thicket belt at T03, with indigenous species (in the foreground), and a clump of Black Wattle *Acacia mearnsii* (left), an exotic tree species that has been planted in large numbers in the area; **(c)** maize field encroaching on the southern edge of the forest between T04 and T05, March 2014; **(d)** indigenous trees felled in the forest, October 2012 (Luca Borghesio)

Vues de Msidunyi. **(a)** l'intérieur du lambeau de forêt à canopée fermée entre T04 et T06, octobre 2011 ; **(b)** bande de fourrés à T03, avec des espèces indigènes (au premier plan), et un bosquet d'*Acacia mearnsii* (à gauche), un arbre exotique qui a été planté en grand nombre dans la zone ; **(c)** champ de maïs empiétant la limite méridionale de la forêt entre T04 et T05, mars 2014 ; **(d)** arbres indigènes abattus dans la forêt, octobre 2012 (Luca Borghesio)

2012). Based on our GPS measurements, the closed-canopy forest had an area of 7.1 ha with a canopy *c.*10–20 m high (Fig. 2a). The canopy layer is composed of trees such as *Strombosia scheffleri*, *Schefflera volkensii*, *Podocarpus* sp., *Xymalos monospora*, *Albizia gummifera*, *Syzygium micklethwaitii* and *Tabernaemontana stapfiana*. Mid-strata and lower layers are characterised by abundant ferns, as well as *Euphorbia engleri*, *Dracaena steudneri*, *Turraea holstii*, *Pauridiantha paucinervis*, *Piper capense* and *Chassalia parvifolia*. The forest is surrounded by a belt of thicket vegetation (Fig. 2b) including exotic trees (*Acacia mearnsii, Eucalyptus* spp., *Cupressus lusitanica*) and a mixture of indigenous shrubs and trees, the remnants of a formerly much more extensive

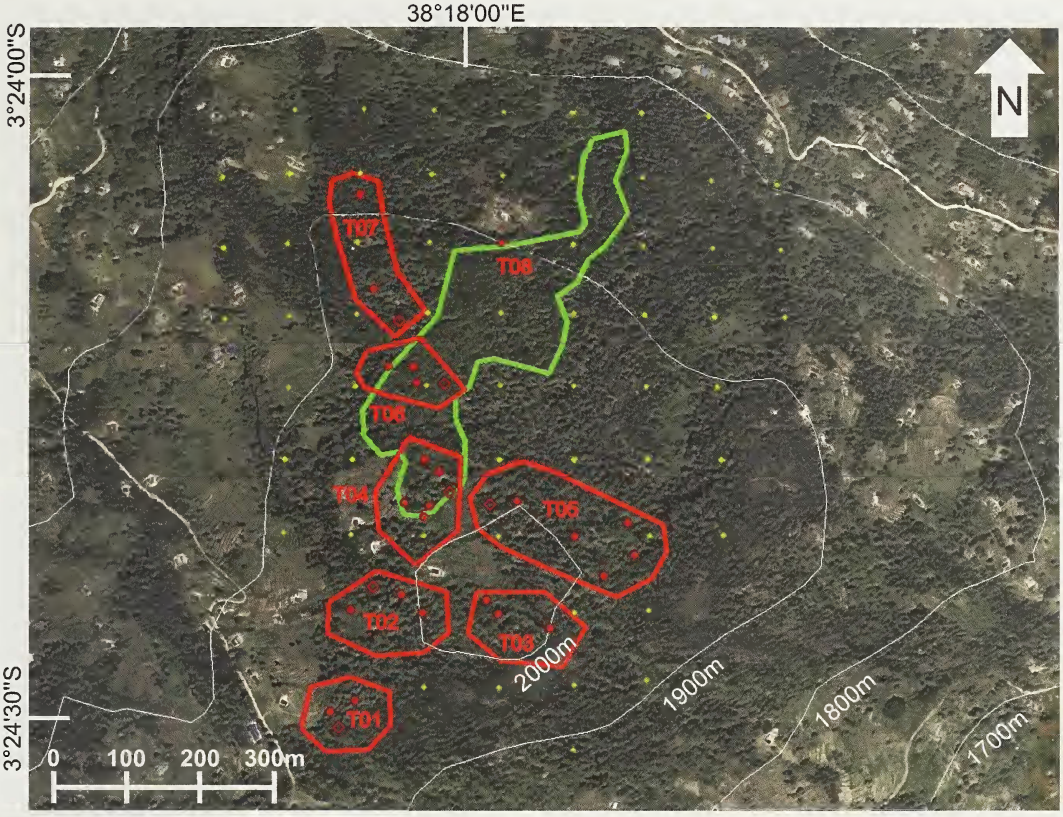

Figure 3. Map of the Msidunyi study area, using a Google Earth (courtesy of Google Inc. All rights reserved © 2012 Digital Globe) aerial photograph dated February 2012. Narrow white lines = 100 m interval contours; the thick green line marks the indigenous forest patch. Red dots show the observations of Taita Apalis *Apalis fuscigularis* obtained during the study, red diamonds mark the position of mist-netting sites. Red lines delimit *A. fuscigularis* territories (see Table 3 for territory codes). Yellow dots show the grid of pre-set sample points, spaced at 100 m intervals, where standardised counts and habitat estimates were recorded.

Carte de la zone d'etude à Msidunyi, basée sur une photo aérienne de Google Earth datée de février 2012 (avec l'aimable autorisation de Google Inc. Tous droits réservés © 2012 Digital Globe). Lignes blanches étroites = courbes de niveau de 100 m ; la ligne verte délimite le lambeau de forêt indigène. Les points rouges indiquent les observations de l'Apalis des Teitas *Apalis fuscigularis* réalisées pendant l'étude ; les losanges rouges la position des sites de capture au filet japonnais. Les lignes rouges délimitent les territoires de *A. fuscigularis* (voir Tableau 3 pour les codes des territoires). Les points jaunes représentent les points d'échantillonnage préétablis, espacés de 100 m, où des comptages standardisés et des estimations de l'habitat ont été réalisés.

forest that is confirmed by aerial photographs from the early 1960s (Beentje 1988). The thicket belt has an area of *c.*45–50 ha (Fig. 3), at altitudes of 1,800–2,020 m.

Methods

We assessed the status of *A. fuscigularis* in the study area during six field work periods (October 2011 to March 2014). We used a combination of different survey techniques, including standardised point counts, opportunistic observations, and mist-netting, with and without playback of *A. fuscigularis* vocalisations (Table 1).

A pre-set grid of regularly spaced sample points (100 m distance) was created using a GIS (Fig. 3). The grid comprised 65 points covering the entire area of Msidunyi forest, plus the thicket belt surrounding it. At each point, within 25 m-radius plots, we visually estimated the extent of four habitat types: closed-canopy indigenous forest, indigenous thicket, exotic plantation and agriculture. Then, using one-way ANOVA, we

Table 1. Summary of field work in Msidunyi between October 2011 and March 2014. The table lists type of sample (opportunistic observations, standardised counts or mist-netting), whether playback was used, number of points visited, no. of detections of Taita Apalis *Apalis fuscigularis* (no. of individuals in parentheses), and frequency of detection (number of detections / number of points).

Tableau 1. Aperçu du travail de terrain à Msidunyi entre octobre 2011 et mars 2014. Le tableau énumère le type d'echantillon (observations opportunistes, comptages standardisés ou captures au filet japonais), l'utilisation ou non de repasses, le nombre de points visités, le nombre de détections de l'Apalis des Teitas *Apalis fuscigularis* (nombre d'individus entre parenthèses), et la fréquence de détection (nombre de détections / nombre de points).

Visit	Type of sample	Playback	No. of points	No. of detections	Frequency of detection
2–4 Oct 2011	Opportunistic observations	Yes	19	9 (17)	0.47
5–8 Dec 2011	Standardised counts	No	68	6 (11)	0.088
15 Oct 2012	Opportunistic observations	Yes	15	4 (7)	0.27
15–19 Feb 2013	Standardised counts	No	57	2 (4)	0.035
18–21 Apr 2013	Standardised counts	Yes	60	3 (6)	0.05
16–20 Mar 2014	Mist-netting	Yes	6	6 (13)	1.00

compared the plots where *A. fuscigularis* was absent with those where it was observed at least once during the survey. Percentages were arcsin-square root transformed to achieve data normality (Zar 1999).

Standardised bird counts were made at the nodes of the grid. In December 2011 and February 2013 we performed ten-minute point counts without playback. In April 2013 we performed six-minute counts with playback (one minute of playback, followed by two minutes listening, repeated twice at each point). Counts were always performed by two observers. Recordings of *A. fuscigularis* were provided by the Wildlife Sounds section of the British Library. Calls were broadcast using an Altec Lansing im237 loudspeaker, connected to a Sandisk mp3 player. To map observations with high accuracy, for each group of *A. fuscigularis*, we recorded distance using a tape measure and compass direction from the observers to the birds; this was not done while playback was being performed, as the birds moved in response to it.

Opportunistic observations were collected in October 2011 and 2012. During these observations, we played *A. fuscigularis* vocalisations, but did not record data at nodes of the pre-set grid. In order to minimise disturbance to the birds, recordings were never played for more than five minutes at the same site.

Playback of recorded calls permitted us to collect information on the sex ratio of the *A. fuscigularis* population. In birds, skewed sex ratios are often observed in declining populations (Donald 2007), including for Taita Thrush, the other Critically Endangered bird endemic to Taita (Lens *et al.* 1998). Thus, we use sex ratio as an initial surrogate of population health. *A. fuscigularis*, like other species within the Bar-throated Apalis *A. thoracica* group (Dowsett-Lemaire 2010), responds quickly to playback of its song, and, as we describe in the Results, the two sexes can be distinguished using calls, behaviour and plumage patterns.

In March 2014, we performed one session of mist-netting at Msidunyi as well as in three other Taita forest fragments (Ngangao, Yale and Vuria). Birds were attracted using pre-recorded vocalisations, and captured in 12 × 2.5 m, 16-mm mesh nets. Each bird was ringed with National Museums of Kenya metal and coloured plastic rings to permit subsequent individual identification. For each captured bird, we recorded biometrics, assessed moult state and took photographs to permit comparison of plumage patterns.

Results

Sexing and ageing

As few data are available in the literature concerning ageing and sexing *A. fuscigularis*, we first describe how to distinguish males versus females and adults versus immatures. The following information is not restricted to Msidunyi, as it was obtained over the entire range of *A. fuscigularis*.

Playback of recorded vocalisations elicits rapid responses by pairs. Birds attracted using playback show clear differences in morphology, voice and behaviour. Two plumage types occur: the first has a darker head, throat and upper breast,

Figure 4. Ageing and sexing of Taita Apalis *Apalis fuscigularis*: **(a)** adult male and **(b)** adult female, Ngangao forest fragment, 1 October 2011; these two individuals duetted in response to playback of pre-recorded songs, suggesting they were members of the same pair; **(c)** adult male and **(d)** adult female, captured in the same net (T05) in Msidunyi, 16 March 2014; **(e)** immature, Vuria, 13 March 2014, showing the greyish iris, and yellowish gape, which was not evident in all of the immatures that we examined (Luca Borghesio)

Détermination de l'âge et du sexe de l'Apalis des Teitas *Apalis fuscigularis* : **(a)** mâle adulte et **(b)** femelle adulte, lambeau de forêt de Ngangao, 1er octobre 2011 ; les deux individus chantaient en duo en réponse à la repasse de chants enregistrés préalablement, ce qui suggère qu'ils formaient un couple ; **(c)** mâle adulte et **(d)** femelle adulte, capturés dans le même filet japonais (T05) à Msidunyi, 16 mars 2014 ; **(e)** immature, Vuria, 13 mars 2014, montrant un iris grisâtre et des commissures jaunâtres ; ces dernières n'étaient pas apparentes chez tous les immatures examinés (Luca Borghesio)

Table 2. Moult, iris colour, plumage characteristics and biometrics of individuals of Taita Apalis *Apalis fuscigularis* mist-netted in March 2014. For wing length, sample size is six adult males and no adult females, as most females were moulting their wing feathers. For tarsus and mass, sample size corresponds to the total number of individuals.

Tableau 2. Mue, couleur de l'iris, caractéristiques du plumage et mensurations des Apalis des Teitas *Apalis fuscigularis* capturées dans les filets japonais en mars 2014. Pour la longueur de l'aile, l'echantillon est de six mâles adultes et zéro femelles adultes, car la plupart des femelles étaient en train de muer les primaires. Pour le tarse et le poids, l'echantillon correspond au nombre total d'individus.

	Adult males	Adult females	Immatures
Total no.	17	5	7
Plumage	Dark	Pale	Pale
Iris	Cream-white	Cream-white	Grey
Active moult	16	5	1
No moult	1	0	6
Wing (± SD)	53.2 ± 0.8 (*n* = 6)	No data	53.1 ± 0.7
Tarsus (± SD)	20.9 ± 0.6	20.8 ± 0.5	20.7 ± 0.6
Mass (± SD)	12.0 ± 0.6	11.4 ± 0.1	11.5 ± 0.3

while the second has brown-grey tones on the head, and a paler grey throat and upper breast (Fig. 4a–b). The vocal reaction of dark birds to pre-recorded calls was swifter than that of the pale ones: in 19 playback replicates undertaken in three distinct forest fragments (Ngangao, Msidunyi and Fururu), dark birds responded before pale ones 11 times, in seven cases the vocal response of the two birds of the two plumage types was contemporaneous, while only once did a pale bird respond to pre-recorded calls faster than a dark one (Chi-squared test, $p = 0.018$). Vocal behaviour also differs between dark and paler birds. Birds of the two plumage types usually duet, with darker birds uttering a stronger *tchep-tchep-tchep...* and paler ones responding with a softer *ti-ti-ti....* This corresponds to the description of the vocalisations of *A. thoracica* in Érard *et al.* (1997).

During mist-netting, we captured 29 individuals of *A. fuscigularis* (Ngangao $n = 9$, Vuria $n = 11$, Msidunyi $n = 8$, Yale $n = 1$). In the hand, besides the dark or pale plumage described above, birds differed in moult state and iris colour (Table 2, Fig. 4c–e). In summary, all of the darker birds had a cream-white iris and were almost all in heavy moult, whereas paler birds either had a cream-white iris and were in moult, or had a grey iris and no moult. No significant difference was found in body size (weight, tarsus, wing length) between these groups (one-way ANOVA, all comparisons $p > 0.05$), but the sample size should be increased in order to perform more powerful statistical tests.

We interpret the above results as follows: darker individuals were adult males, paler ones with cream-white irides adult females, while those with grey irides were immatures of both sexes. Heavily moulting adults in March suggest that this is the post-breeding period, which accords with the available nesting records of the species (Wagura *et al.* 2012).

Population assessment and habitat use

We performed 125 standardised counts without playback and 60 with playback. The counts yielded 11 detections of 21 individuals, while opportunistic observations produced another 13 detections of 24 individuals (Table 1). At the time when counts were performed, birds were not individually recognisable as no ringing had occurred. Therefore, it is probable that some of the above detections represent multiple records of the same individuals. Frequencies of detection of *A. fuscigularis* were higher in October–December and lower in February and April (Table 1). As these two periods correspond to the early and late nesting season, respectively (Wagura *et al.* 2012), variation in detection frequency might be related to the breeding cycle.

Sites where *A. fuscigularis* was observed were not restricted to closed-canopy forest (Fig. 3), but were widespread in that part of study area without exotic tree plantations. Furthermore, sites where *A. fuscigularis* was observed possessed significantly more forest and indigenous thicket, but fewer exotic trees than sites where the species was not seen (Table 4).

Table 3. Summary of observations of Taita Apalis *Apalis fuscigularis* in the territories identified in Msidunyi. The table shows whether males (M), females (F) or immatures (I) were observed. T08 was occupied by a single individual (probably an immature) in April 2013, therefore we do not consider it as a permanent territory.

Tableau 3. Aperçu des observations de l'Apalis des Teitas *Apalis fuscigularis* dans les territoires identifiés à Msidunyi. Le tableau indique s'il s'agissait de mâles (M), de femelles (F) ou d'immatures (I). T08 était occupé par un seul individu (probablement un immature) en avril 2013 ; pour cela nous ne le considérons pas comme un territoire permanent.

Territories	Oct 2011	Dec 2011	Oct 2012	Feb 2013	Apr 2013	Mar 2014
T01	M+F			M+F		M+F
T02	M+F		M		M+F	M+F
T03	M+F	M	M+F			
T04	M+F	M+F	M+F		M+F+I	M+F+I
T05	M+F	M+F	M+F	M+F		M+F
T06	M+F	M+F				M+F+I
T07		M+F				M+F+I
T08					I?	

Table 4. Habitat composition of 25-m radius plots centred on the 65 grid sample points; numbers are mean plus or minus standard error. Differences between plots where Taita Apalis *Apalis fuscigularis* was observed or not were tested using one-way ANOVA.

Tableau 4. Composition de l'habitat des parcelles d'un rayon de 25 m des 65 points d'echantillonnage de la grille ; les nombres indiquent des moyennes plus ou moins une erreur standard. Les différences entre les parcelles où l'Apalis des Teitas *Apalis fuscigularis* a été observée ou non ont été testées en appliquant une ANOVA simple.

Habitat type	Apalis absent	Apalis present	ANOVA
Forest	16.5 ± 4.6%	39.8 ± 8.1%	$F_{1,63} = 11.2$; $P = 0.0014$
Thicket	5.8 ± 1.9%	25.1 ± 6.9%	$F_{1,63} = 11.3$; $P = 0.0013$
Exotic plantation	61.3 ± 6.1%	30.2 ± 9.2%	$F_{1,63} = 6.6$; $P = 0.011$
Agriculture	16.4 ± 4.4%	4.9 ± 3.2%	$F_{1,63} = 1.9$; $P = 0.17$
Sample size	48	17	–

The March 2014 mist-netting session identified the location of *A. fuscigularis* pairs in the area. The lowest part of the study area (1,790–1,890 m), in the north and east, is not occupied by *A. fuscigularis*. This area (*c.*30% of the study site) is mostly occupied by exotic trees. Elevation of *A. fuscigularis* records ranged from 1,890 to 2,010 m, and clustered into seven territories (Fig. 3), where pairs were observed multiple times between October 2011 and March 2014 (Table 3). This suggests that the territories were occupied by stable pairs, but long-term mark-observation studies would be needed to confirm this hypothesis.

Breeding and sex ratio

Playback during standardised counts, opportunistic observations and mist-netting produced 22 records of *A. fuscigularis*. Of these, 19 were pairs and three involved single adult males. Based on these data, sex ratio was 0.93 females to one male. This ratio does not differ from unity (Chi-squared test, p = not significant). Immatures were observed four times over two successive years during our survey (Table 3). This confirms that breeding occurs regularly in Msidunyi.

Additional observations

Other species of interest observed during our field work included the endemic Taita White-eye *Zosterops* (*poliogastrus*) *silvanus* and the endemic butterflies *Cymothoe teita* and *Papilio desmondi teita*. Among plants, the trees *Dasylepis integra* (Eastern Arc endemic; IUCN: Vulnerable) and *Prunus africana* (Vulnerable) were found in the forest and in the shrub belt surrounding it. One *Psychotria* sp. shrub might prove to be the undescribed '*Psychotria* species B' listed by Beentje *et al.* (1994) and feared extinct as it has not been found at Taita for decades. We also found the shrub *Psychotria petitii* and the forb *Impatiens teitensis* ssp. *teitensis*—both of which are Taita endemics.

At the time of our first visit, the Msidunyi forest fragment was remarkably intact, with few signs of human activity. By March 2014, however, human disturbance, logging and agriculture had increased dramatically (Figs. 2c–d).

Discussion

This study confirms that Msidunyi is a key site for Taita Apalis, with several other endemic and/or globally threatened species also present. At least seven territorial pairs of *A. fuscigularis* occur in the area, or 3.3–6.7% of the species' estimated global population as of 2001 (Borghesio *et al.* 2010), but up to 15% if, as long-term monitoring suggests, a major decline in numbers has occurred recently (Borghesio *et al.* 2014). The presence of *A. fuscigularis* in Msidunyi is stable, as we observed territorial pairs occupying the same territories on six subsequent visits over a period of almost three years. Moreover, breeding occurred in the area and the sex ratio was almost equal to unity during the survey.

In terms of indigenous forest area, Msidunyi is relatively small compared to the three largest forest fragments in the Taita Hills, namely Mbololo (220 ha), Ngangao (120 ha) and Chawia (86 ha) (Pellikka *et al.* 2009, BirdLife International 2014b). However, numbers of *A. fuscigularis* in these other fragments are either very small (<5 pairs in Mbololo and Chawia) or rapidly declining (>60% decrease in Ngangao since 2001: Borghesio *et al.* 2014). In terms of conservation, Msidunyi appears to support either the second-

or third-most important subpopulation of the species, after Ngangao, where a rapid decline questions its long-term persistence, and Vuria, which is spatially close (1.5 km) and probably biologically connected to Msidunyi.

The distribution of *A. fuscigularis* in Msidunyi was not homogeneous. Localities at lower elevations (<1,890 m) were apparently unoccupied. However, elsewhere in the Taita Hills (Chawia forest), *A. fuscigularis* occurs at altitudes as low as 1,500 m. Thus, the absence of *A. fuscigularis* at lower elevations in Msidunyi is probably explained by the abundant presence of exotic tree plantations, which are strongly avoided by the species.

Interestingly, most observations of *A. fuscigularis* were obtained outside or at the edge of the patch of indigenous closed-canopy forest. This confirms that it favours relatively open vegetation, such as forest edges or canopy gaps, and avoids dense closed-canopy forest. In another study, we also found that nest sites appear to be located in canopy gaps within Ngangao Forest (Wagura *et al.* 2012). These results suggest that conservation action in Msidunyi needs to focus on an area extending beyond the patch of indigenous forest, including the thicket belt, from *c.*1,800 m and above. This area covers >50 ha. At the same time, the species' strong avoidance of exotic trees suggests that interventions aimed at removing exotics and restoring indigenous vegetation will certainly benefit Taita Apalis. Removal of exotic trees might not only be a relatively simple and cheap habitat restoration intervention in Msidunyi, but could also be implemented in all of the Taita Hills forest fragments, because exotic plantations are widespread in the area (Pellikka *et al.* 2009, 2013).

Besides confirming the biological importance of Msidunyi, our field work demonstrates the extreme urgency of acting to prevent the destruction of this tiny remnant forest and other habitats with indigenous vegetation in the area. During the short duration of our field work, we observed widespread damage caused by selective logging of indigenous trees. Simultaneously, cultivated areas markedly expanded in the years during our survey, suggesting that most natural habitats may soon be replaced by agriculture, unless urgent action is taken.

This work provides baseline biological knowledge crucial to inform action to counter the rapid decline of *A. fuscigularis* within its small range. However, more detailed biological data are needed to organise targeted actions and gather the support of local communities, as well as governmental organisations and NGOs, with respect to the current status of the species and the global importance of Msidunyi for its conservation.

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[a] *Corso Re Umberto 42, 10128 Torino, Italy. E-mail: borghesio@gmail.com*

[b] *Dept. Zoology, National Museums of Kenya, Nairobi, Kenya.*

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